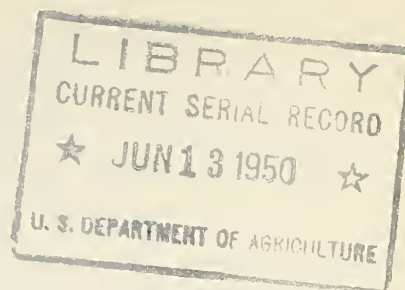


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PREPACKAGING CRANBERRIES *Cooperatively*



BY OSCAR R. LEBEAU



A STUDY CONDUCTED WITH FUNDS PROVIDED BY THE RESEARCH AND MARKETING ACT

COOPERATIVE RESEARCH AND SERVICE DIVISION
FARM CREDIT ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

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HAROLD HEOGES, CHIEF

JOSEPH G. KNAPP, ASSOCIATE CHIEF

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SUMMARY

Successful marketing of the annual cranberry crop requires that growers, shippers and distributors give close heed to changing consumer demand and to modern merchandising practices.

The rapid development of super markets and self-service stores has resulted in a marked demand for prepackaged ready-to-take-home foods. In the case of fresh cranberries this has meant that many shippers have had to switch from packing in quarter-barrel wooden boxes to one-pound transparent bags or window cartons.

In shifting from bulk packaging to prepackaging, cranberry shippers have had to cope with many new problems. Cranberry growers' and shippers' cooperatives have proved effective in meeting these problems. Through group action these organization have helped to provide and to coordinate many services which otherwise would be unavailable to individual growers.

Experience to date indicates that the one-pound transparent bag is by far the most popular consumer package for cranberries. These one-pound bags are either ready-made or made at the plant by a special machine that fills and makes a pillow-shaped bag. Ready-made bags have generally received more enthusiastic acceptance than have pillow-shaped bags. However, the one-pound window carton has gained in favor during the past season. While slightly more expensive than the one-pound transparent bag it provides a convenient consumer-size unit for growers who wish to avoid a heavy investment in packaging equipment.

Data gathered from representative packers indicate that it costs only a few cents more per quarter-barrel unit to package cranberries in cellophane than in bulk. The savings effected by eliminating the old-fashioned wooden box nearly offset the new costs incurred in prepackaging. It is probable that this difference may be eliminated entirely with an increase in volume and efficiency.

Two types of packaging machines have made prepackaging cranberries easier. One machine fills ready-made bags, the other -- the transwrap type -- makes and fills the bags simultaneously. The machine filling ready-made bags are well adapted to moderate size operations. By increasing the number of units the output can be increased to any desired volume. The transwrap bag making and filling type of machine is well adapted for high volume output. It produces a pillow-shaped package.

A comparison of preliminary cost data by type of machine reflects a substantial saving in cellophane and labor costs for the transwrap type of machine over those for the smaller type machine. This only holds, of course, when the volume is sufficient to justify the larger equipment. However, some buyers object to these pillow-shaped bags, saying they are too loosely packed and that the printing doesn't appear in the same place on each bag.

Equipment investment and depreciation is larger in the case of pre-packaging than in bulk packaging. The depreciation cost is also greater in the case of large transwrap machines than for smaller machines using ready-made bags.

Master or carrier cases represent a substantial cost factor in pre-packaging. Improvement in their design and size has resulted in considerable savings. Further refinement to improve ventilation and to help control dampness is desirable.

Many problems continue to vex cranberry prepackers. These include installing and maintaining new equipment, selecting suitable and economical containers, holding labor costs within reasonable bounds, and maintaining a high quality pack. Cranberries of irregular size and color are often all right for processing but have poor acceptance in fresh market channels. To insure maximum consumer demand, it is essential that only berries of acceptable color and quality be prepackaged. The percentage of the crop that can qualify for prepackaging will vary from year to year. Ordinarily probably not more than 70 to 80 percent of the yield are suitable for sale through fresh market channels. Another problem is that of finding a package that will stand up satisfactorily in storage. Still another is that of maintaining a high quality, attractive looking pack that will appeal to consumers.

Market trends indicate that despite the problems involved in prepackaging, an increasingly large proportion of the cranberries offered for fresh market sales undoubtedly will have to be packed in consumer-sized units. Over half -- 54 percent -- of the 1948-49 cranberry crop that was marketed fresh was prepackaged. Estimates for 1949-50 indicated that 75 percent of the cranberries sold fresh were prepackaged. Only by adapting their packaging operations to current market trends can cranberry cooperatives have reasonable assurance of procuring maximum returns for their grower members.

PREPACKAGING CRANBERRIES COOPERATIVELY

By

Oscar R. LeBeau
Agricultural Economist

BACKGROUND INFORMATION

GROWTH OF PREPACKAGING

For many autumns, fresh red cranberries went to market almost entirely in quarter-barrel boxes holding about 25 pounds each. From these wooden boxes the grocer would scoop out and weight the cranberry orders of his retail customers.

With the coming of self-service super markets a gradual demand for cranberries in ready-to-take-home consumer-size packages developed. This increasing demand changed to a record-breaking spurt of revolutionary proportions during recent seasons. Cranberries in one-pound containers are now the rule rather than the exception in most up-to-date retail stores.

PURPOSE OF STUDY

This almost overnight switch in demand from quarter-barrel or bulk containers to one-pound packages has been accompanied by many headaches for cranberry packers. Not the least of these have been the increased costs involved.

This study -- made with funds furnished by the Research and Marketing Act of 1946 -- sets forth some comparative cost figures for prepackaging and bulk packaging. It aims also to point out certain factors affecting the efficiency of the prepackaging operation and related problems.

The findings should be of service not only to cranberry shippers but also to the packers of other edible commodities confronted with similar prepackaging problems.

LIMITATIONS OF THE STUDY

The current study is based on an analysis of the comparative packaging costs reported by a number of associations for the 1948 cranberry crop. It aims simply to estimate the additional expense of packaging cranberries in one-pound containers over that of quarter-barrel boxes after the berries have been screened and graded.

For this purpose four cost factors were considered; namely, unit containers, carrier cases, prepackaging labor, and equipment depreciation. In assembling these data it was difficult in some instances to

ferret out the exact cost from existing records. Frequently the accounts made no provision for separate records. Where these conditions prevailed, it was necessary to rely on the best estimates available from the plant foreman and others familiar with the actual operations.

The equipment depreciation costs are based on a flat 10 percent of the reported value of the equipment. The average depreciation cost per case was estimated by dividing the total calculated depreciation by the number of cases reported packed by the respective types of machines. When calculated in this manner, the average depreciation costs per case for the large machines amounts to less than twice that of the smaller machines, whereas the actual investment in a large machine normally amounts to about five times that of the smaller machine.

In interpreting the cost figures presented, it should be recognized that some of these associations were packaging cranberries in cellophane for the first time. Greater efficiency is almost certain to occur as the packers gain in experience and as the volume packed in cellophane increases.

Moreover, the shift to cellophane was so rapid that a number of packing houses had to resort temporarily to the best make-shift facilities possible. Some of these conditions have since been improved with resultant savings in labor and other costs.

AREAS OF CRANBERRY PRODUCTION

The United States produced an average of about 825,000 barrels (or hundredweight) of cranberries annually during the 5 years 1945-49. The annual postwar production has ranged from about 657,000 barrels in 1945 to a maximum of 968,000 barrels in 1948.

Commercial production is limited principally to five States: Massachusetts, Wisconsin, New Jersey, Washington, and Oregon. Long Island produces a small quantity. Massachusetts alone accounts for more than five-eighths -- 64 percent -- of the U. S. production see figure 1.

UTILIZATION OF THE CROP

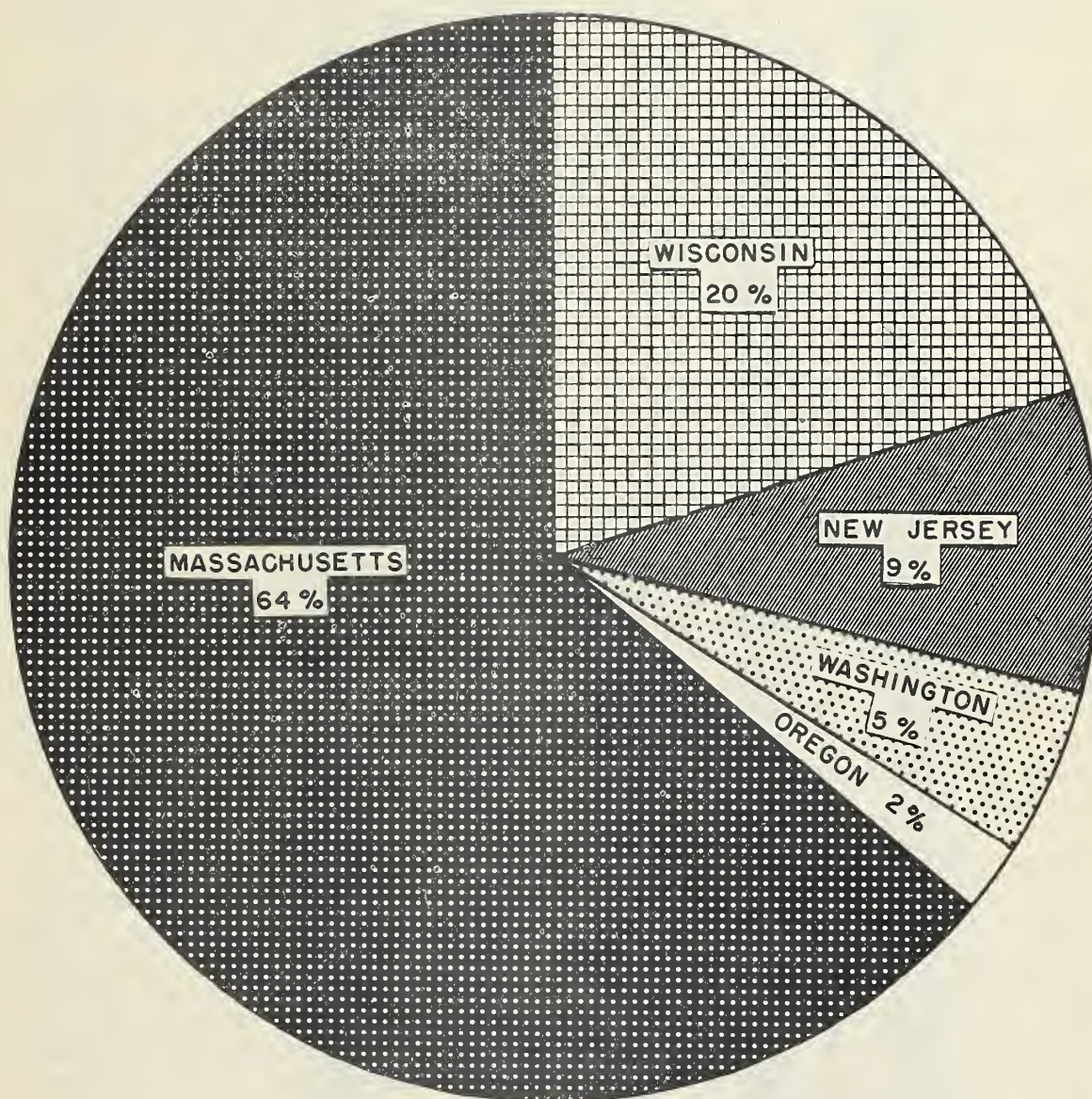
The cranberry crop of the United States flows through two general channels -- fresh market sales and processed cranberry products.

Prior to Pearl Harbor most of the cranberries produced in the United States were marketed as fresh fruit. With few exceptions these berries were sold in bulk containers, the most popular being the 25-pound quarter-barrel box.

The heavy military requirements for canned and dehydrated cranberries during World War II led to greatly expanded facilities for processing. While the quantity dehydrated during postwar years has been virtually nil, other forms of processing continue to account for a substantial

FIGURE 1

DISTRIBUTION OF U.S. CRANBERRY PRODUCTION
BY STATES, 5 YEAR AVERAGE, 1945-49



NOTE: MASSACHUSETTS, WISCONSIN AND NEW JERSEY ARE THE
PRINCIPAL CRANBERRY PRODUCING STATES.

share of the production. This reflects the steady increase in the demand for ready-to-serve foods.

Figure 2 shows the utilization of the cranberry crops for the years since World War II as reported by the Bureau of Agricultural Economics of the U. S. Department of Agriculture.

In 1945 sales of fresh cranberries and processed cranberries were about fifty-fifty, but in 1946 and 1947 the percentage sold fresh accounted for only 31 percent and 37 percent of the respective crops.

Because of the substantial stocks of processed cranberries existing at the beginning of the 1948-49 and 1949-50 seasons leaders of the cranberry industry made a special effort to market as high a percentage as possible of the 1948 and 1949 crops through fresh market channels. Despite these efforts, fresh sales in 1948-49 accounted for only 48 percent of the total supply and unsold stocks of berries available for processing at the beginning of the 1949-50 season were the largest on record.

Preliminary estimates for the 1949-50 season by officials of the American Cranberry Exchange, New York City, place the quantity sold fresh at 520,000 barrels. Similar preliminary estimates by officials of the National Cranberry Association, Hanson, Mass., indicate the quantity processed at about 248,000 barrels. According to these preliminary estimates, about 68 percent of the 1949 crop was marketed fresh -- the largest since before Pearl Harbor.

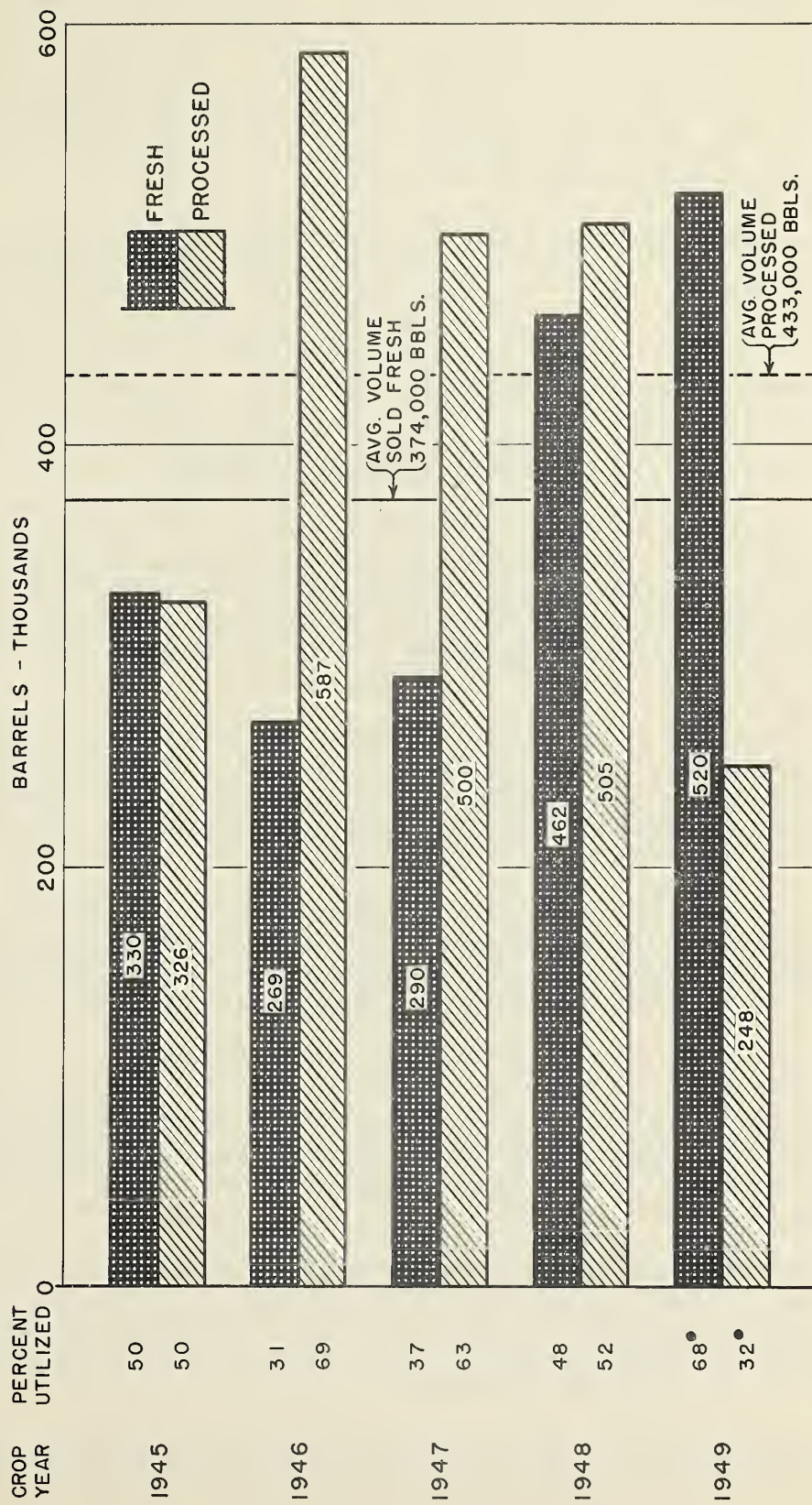
The above estimates covering the disposition of the 1949 crop account for only 768,000 barrels as compared to the USDA production estimate of 856,800 barrels published in December 1949. Most of this difference can be attributed to the greater than usual shrinkage that occurred this year. Cranberry leaders have estimated that this shrinkage amounted to about 100,000 barrels for the berries disposed of through fresh market channels.

Industry leaders report that buyers and consumers of fresh cranberries have become so particular regarding size, color, quality and appearance that it is just about impossible for more than 70 to 80 percent of the cranberries to qualify for sales through fresh channels. This was particularly true of the berries harvested in 1949 when the quality and keeping characteristics of the crop were below par. Cranberries of irregular size and color are often all right for processing but have little acceptance in fresh market channels. The same is true of many mixed varieties harvested from the older bogs.

PRINCIPAL MARKETING COOPERATIVES

There are two principal cranberry marketing organizations in the United States, the American Cranberry Exchange and the National Cranberry Association. These two cooperatives together marketed between 80 and 85 percent of the 1948 and the 1949 crops.

FIGURE 2
UTILIZATION OF UNITED STATES CRANBERRY PRODUCTION
BY YEARS, 1945-49



● PRELIMINARY

NOTE: IN 1946, 1947 AND 1948, THE VOLUME OF CRANBERRIES THAT WENT INTO PROCESSING EXCEEDED THE VOLUME SOLD THROUGH FRESH MARKET CHANNELS. THIS SITUATION WAS REVERSED IN 1949.

The American Cranberry Exchange is a large federated cooperative with general headquarters in New York City. It has member associations in New England, New Jersey, Wisconsin and Oregon and a number of direct members on Long Island and in Quebec, Canada. These member associations help growers with cultural practices and give general supervision to the grading, packing and shipping of the berries. The Exchange does the marketing. The Exchange is widely known in the produce world for its "Eatmor" brand fresh cranberries.

The National Cranberry Association is a large centralized cooperative with its principal offices in Hanson, Mass. Previously named the Cranberry Cannery, Inc., this association has large processing plants in Hanson and Onset, Mass.; Bordentown, N. J.; North Chicago, Ill.; and Markham, Wash. It sells its canned cranberries, cranberry sauces, cranberry preserves, cranberry juices, and other processed products under the well-known "Ocean Spray" label.

CRANBERRY GROWERS COUNCIL

A most important factor in the maintenance of an orderly market for fresh cranberries has been the quantity offered for fresh market sale. By having an alternate outlet through processing a portion of the crop each year, growers have been able normally to prevent demoralization of the fresh market prices. To achieve this a coordinated program has been evolved.

Early in 1949 the directors of the above two cooperatives took the lead in organizing the Cranberry Growers Council. This new body has the responsibility of recommending the quantity of available berries to be allocated for fresh market sales and for processing. This has made possible a coordinated marketing program.

Under the new plan, the American Cranberry Exchange has the responsibility of marketing cranberries that are allocated for fresh market sales and the National Cranberry Association has the job of processing and marketing canned, frozen and other processed cranberry products.

TYPES OF CONSUMER PACKAGES USED

The two most popular types of consumer-size packages for cranberries have been the one-pound cellophane bag and the one-pound window carton. Each of these packages is discussed in detail in subsequent sections of this report.

The one-pound cellophane package has by far the largest demand. The bags can be bought ready made and filled with a machine designed for that purpose, or cellophane can be purchased in rolls and the bags made and filled in a single operation. The latter method involves the use of large and more expensive equipment.

Used to a much lesser extent is the one-pound cardboard carton with a transparent window. This type of container generally costs slightly

more per package. It is used principally in Wisconsin where several small packers like it because it can be used without entailing a heavy investment in equipment.

In earlier years market quotations for fresh cranberries were based on the familiar quarter-barrel box with a premium of about 25 cents for cranberries in cellophane. Beginning with the 1949 season, however, the trade has been quoting fresh cranberry prices quite generally on the basis of a case of 24 one-pound bags, with a slightly lower price for those willing to take quarter-barrel boxes. This has tended to stabilize the price of the consumer-size pack.

GOOD QUALITY PACK IMPORTANT

Successful marketing of prepackaged cranberries -- as with other commodities -- requires a pack of top quality and appearance. This calls for vigilant inspection and grading. Leading prepackagers have recognized that cranberries packaged in transparent units have a better sales appeal if the berries are of good size and uniform appearance.

The New England Cranberry Sales Company, for instance, recommended in 1949 that wherever feasible fresh cranberries be passed over a 14/32" screen followed by a 10/32" screen. The previous combination in general use has been a 13/32" grader and a 9/32" grader. The more rigid sizing is designed to provide a uniform product of the best possible quality and appearance.

Quality is much more of a problem in some years than others. The cranberries produced in 1948, for example, stood up much better generally than did those harvested in 1949. The hot weather that prevailed during the latter part of the 1949 growing season greatly affected the quality of berries harvested.

Despite the grading efforts made, market observers report that many of the berries offered were of poor quality. This hurt consumer demand and caused shippers and handlers considerable grief and expense.

For cranberries to reach the consumer in first-class condition it is important that they be kept cool and retailed fairly promptly after they are graded and packaged. This is especially important in the case of the transparent consumer-size packages. Prospective purchasers, seeing one or two bad berries, may reject the package. If this happens to many packages the entire lot will have to be repackaged at tremendous expense.

Because of these considerations, many growers would prefer to be able to continue to market their berries in quarter-barrel boxes. They argue that cranberries packed in wooden boxes stand up better in storage; that the boxes provide larger display packages; and that occasional defective berries can be removed as they appear with little expense.

A number of shippers hold that the quarter-barrel box accompanied by an adequate supply of empty bags for the retailer to fill would be a better

proposition. It is problematical whether many handlers could be induced to assume this service without a substantial price incentive. The fact still remains that to sell the maximum quantity of fresh berries, it is essential to give the retailer and the customer the type of package they prefer.

PREPACKAGING CRANBERRIES IN TRANSPARENT BAGS

A number of cranberry growers prepackaged a small portion of their sales in transparent bags even before World War II. However, it was not until the large cranberry crop of 1948 that the industry encountered genuine difficulty in disposing of its cranberries unless they were offered in consumer-size packages.

Cranberry shippers would have preferred to follow the conventional method of selling their product in bulk containers, but with heavy supplies of cranberries on hand in 1948 and 1949 buyers were in position to say how they wanted their berries packed. Many handlers passed by quarter-barrel boxes for cranberries in cellophane. So marked was their demand for cranberries in consumer-size packages that some growers were forced to withdraw their quarter-barrel boxes from the market. They diverted some of these to processing plants. Other growers had their berries custom-packed in cellophane and returned them for fresh market sale.



This attractive transparent bag is by far the most popular type of cranberry package. Ninety-nine percent of the cranberries prepackaged by cooperatives in 1948-49 were sold in transparent bags.

PROBLEMS ENCOUNTERED

The changing market situation necessitated quick conversion from bulk packing to packing in one-pound containers. In effecting this shift several vexing problems confronted packers.

How could they best utilize or dispose of the quarter-barrel boxes on hand? How would the costs of prepackaging compare with those of bulk packaging? What new equipment would best serve their prepackaging needs? These were but a few of the problems that accompanied the unprecedented demand for cranberries in one-pound packages.

Most of the growers were able to utilize their inventories of quarter-barrel boxes in these ways: (a) in conveying the ready-to-pack cranberries from the grading line to the prepackaging line, (b) in providing temporary storage containers for the berries awaiting prepackaging, and (c) in filling the decreasing orders for berries in bulk. Some were able to cancel their orders for wooden boxes before delivery. A few still have a supply of the wooden containers for future use.

COMPARATIVE COSTS OF PACKAGING IN CELLOPHANE AND IN BULK

The successful prepackaging of cranberries in one-pound containers involves additional equipment, labor and containers. The expenditures for these items vary from plant to plant, depending on the volume packed and the general efficiency of the operation.

Theoretically the cost of warehousing, screening and preparing the cranberries for packaging is the same for all types of packages. Hence, this study is concerned only with comparing the costs of filling, closing and stacking quarter-barrel boxes and 24 one-pound bag cartons after the berries are ready for packaging.

To implement this comparison, packaging costs and related information were obtained from representative packing houses and sales companies in Massachusetts, Wisconsin, and New Jersey for the 1948-49 marketing season. Statistical information was supplemented by personal observations in five cranberry packing houses in the East. Table 1 summarizes the comparative costs of packaging fresh cranberries in cellophane bags and in bulk.

According to table 1, it cost a few cents more to pack cranberries in a case of 24 one pound bags than in a quarter-barrel box. However, the difference -- 5.8 cents -- was less than one might expect. The savings effected by eliminating the quarter-barrel wooden box nearly offset the new costs incurred in prepackaging. With an increase in volume and efficiency, this difference may be lowered even more. A number of packers have already improved on these costs.

Table 1. - *Cost of packaging fresh cranberries, by type of package, 1948-49*¹

Item	Case of 24 1-lb. bags	Wooden box of 25-lbs. bulk	Difference
	Cents		
Cellophane bags-----	31.5	-	31.5
Carrier case-----	17.0	-	17.0
Wooden box-----	-	47.5	-47.5
Packaging labor-----	7.0	3.4	3.6
Equipment depreciation-----	1.3	.1	1.2
Total-----	56.8	51.0	5.8

¹Based on cost data for 437,921 cases packed in cellophane and 308,639 quarter-barrels packed in wood.

Cost of Cellophane. - The cost of cellophane averaged 31.5 cents per case of 24 bags for the quantity included in this study. The average price by associations ranged from as low as 24 cents to as high as 35.4 cents per case.

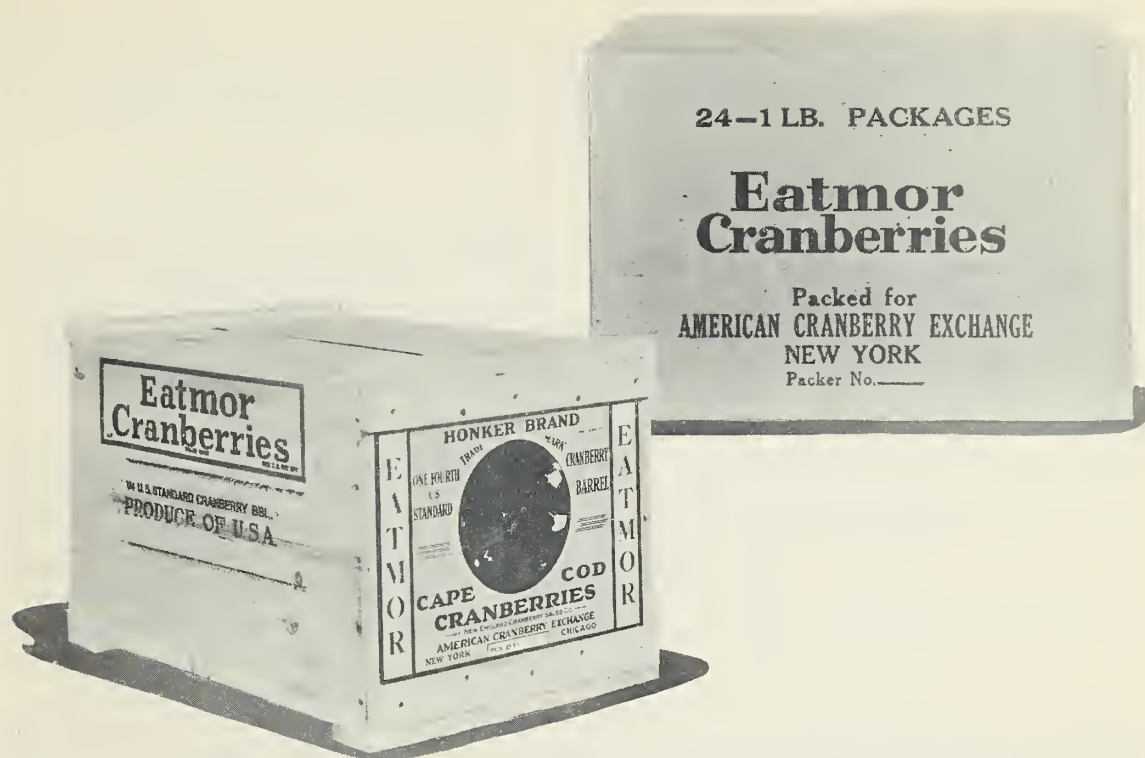
Packers purchasing their cellophane in rolls had lower film costs, naturally, than those using ready-made bags. This point is discussed more fully in a subsequent section headed, "Comparative Cost of Cellophane Packaging by Type of Machine."

Cost of Carrier Cases. - To insure safe transportation of the delicate one-pound units from shipping point to retail stores, a carrier case must be provided. A corrugated cardboard case holding 24 one-pound bags is commonly used for this purpose. The bags are packed three layers deep, eight to the layer.

To procure this case, cranberry packers paid an average of 17 cents each for the quantity included in this study. The lowest cost reported by any firm was 16 cents and the highest, 25.6 cents. This wide range in cost was due mainly to a difference in the cases used.

A short time ago a number of cranberry prepackers were using heavy, liberal-sized cases that cost as much as 28 cents. After it was demonstrated that a smaller, more economical case would provide adequate protection, most shippers adopted the lower priced case. A few of the smaller packers, however, had inventories on hand of the larger cases which lasted them for most of the 1948-49 season. This accounted for a substantial variance in the costs reported by the respective packers that year.

By improving the design and size of the carrier case, prepackers have been saved as much as 10 cents or more per case shipped. Over the years, this will mean a tremendous saving to both growers and consumers.



The box at the top is the new case that holds twenty-four 1-pound cellophane bags. It is fast displacing the old style quarter-barrel wooden box for holding bulk cranberries shown at the bottom.

Cost of Quarter-Barrel Boxes. - A major cost in packaging cranberries in bulk has been the price of the wooden box used for this purpose. This box holds from 23 to 26 pounds of cranberries, depending on the size, quality, and variety of berries packed.

The cost of these boxes averaged 47.5 cents for the quantity included in this study. The price ranged from 47 cents to 50 cents, depending on the date purchased and the amount of transportation and handling charges involved.

The average cost of the wooden box -- 47.5 cents -- was about the same as the combined cost of the cellophane and carrier case -- 48.5 cents.

Cost of Packaging Labor. - Another important item to be considered in comparing packaging costs is that of labor. Labor cost is an outstanding factor, also, when it comes to measuring the efficiency of the local packaging operation. The amount of labor required is closely tied in with the plant arrangement and with the amount of labor-saving equipment used.

Table 1 shows the average labor cost for packaging a case of 24 one-pound units to be 7 cents as compared to 3.4 cents for a quarter-barrel box. Thus, for the quantities studied, prepackaging required about twice as much labor as did packaging in bulk.

However, it is reasonable to expect that the next few years will see considerable reduction in the man hours required for prepackaging while those for bulk packaging have become stabilized through many years of experience.

The labor costs for prepackaging in cellophane ranged from 4.4 cents to 10 cents per case, depending chiefly on the type and adequacy of the equipment used. Moreover, in making the hasty shift from bulk packaging to prepackaging some of the packers had to resort temporarily to procedures which were admittedly inefficient. Yet they were the best that could be improvised for that season.

For example, the ready-to-package berries were frequently placed in wooden boxes at the end of the picking or grading belt and then transported to another room, floor, or building for prepackaging. Sometimes this involved substantial extra labor and time. Yet it appeared the most feasible way of accomplishing the prepackaging that season. Some have since rearranged their prepackaging equipment so that berries can be conveyed directly from the grading belts to the packaging machines with a minimum of labor.

Equipment Depreciation. - The fourth factor to be considered in comparing packaging costs is equipment depreciation. This was calculated uniformly at 10 percent of the quoted value.

The depreciation cost per quarter-barrel packed in this study amounted to an average of less than 0.1 cents for berries packed in bulk to 1.3 cents for berries packed in one-pound bags. Thus, it required about 1.2 cents more per quarter-barrel unit to write off the cost of packaging equipment for prepackaged berries than for berries in bulk.

This is not surprising when it is remembered that bulk packaging requires very little equipment. The wooden boxes are simply filled to capacity, then lidded with a hand hammer and conveyed to cars or trucks by hand carts or mechanical conveyors.

To package cranberries in cellophane, on the other hand, requires delicate weighing, filling, and closing equipment. For efficient operation, a mechanical conveyor system is generally desirable. The actual amount invested in equipment varies substantially with the type and size of the packaging operation.

TYPES OF MACHINES USED IN PREPACKAGING

The prepackaging of cranberries has been made much easier by the availability of satisfactory machines. At least 5 or 6 manufacturers have perfected equipment suitable for this purpose.

These machines may be divided into two general classes, namely; (a) machines that fill ready-made bags, and (b) machines that make and fill bags simultaneously. Both types have strong supporters among cranberry packers. Both are well-suited, also, for packaging other items such as dry beans, peas and nuts.

Machines Using Ready-Made Bags. - Several makes of this type of machine are in use. They are especially well-adapted to moderate-sized packaging operations. A single machine can package an average of 35 to 40 bags a minute and may do as high as 60 bags. This is ample to handle the output of many growers.

Moreover, by increasing the number of machines and packaging lines, the output of a plant can be expanded to any desired volume. One large cranberry shipper has installed 7 of these machines in a single warehouse. Batteries of 2, 3, or 4 have been installed in several warehouses in Massachusetts, Wisconsin, and New Jersey.

As shown in the picture, the graded cranberries drop into three hoppers at the top of the machine. Delicate automatic scales weigh out a pound in each instance. Generally from 1/2 to 1 ounce overweight is added to insure full retail weight after evaporation. Each hopper discharges berries through the funnel in rapid rotation.

The first attendant holds the cellophane bag over the mouth of the funnel to receive the discharge. She then places the filled bag on a moving belt.



This efficient machine can package an average of 35 to 40 ready-made bags a minute and may do as high as 60 bags. It is especially suited for moderate size packaging operations.

The second worker settles the contents of the bag, folds the top, and leads it into the heat-sealing machine at the far right. In some plants, a third girl added to the line helps with this operation. The picture shows the top of the moving bags as they approach the sealer.

The four packages in the foreground of the picture have been placed there merely for display purposes. In actual practice, these bags are conveyed directly through the heat-sealer and off to the right where another girl speedily packs 24 of them into a carrier case.

The filled cases move by conveyor through an automatic closing machine that seals the tops. The closed cases then proceed by conveyor into waiting trucks or railroad cars to be rushed to market -- or go into refrigerated storage for future delivery.

A general foreman spot-checks the packages periodically to see that the scales are in proper adjustment. The same person usually services the machines and sees that the necessary supplies are on hand.

The cost of setting up such a packaging line will vary with the type of machine purchased, the efficiency of the packaging crew, and the degree to which the packaging line is mechanized. A Wisconsin operator reports that he has been able to set up a complete prepackaging line for \$2,100 which can package about 250 barrels or 1,000 cases of 24 one-pound bags in a 10-hour day. A few operators have established packaging lines for less. Others have invested considerably more.

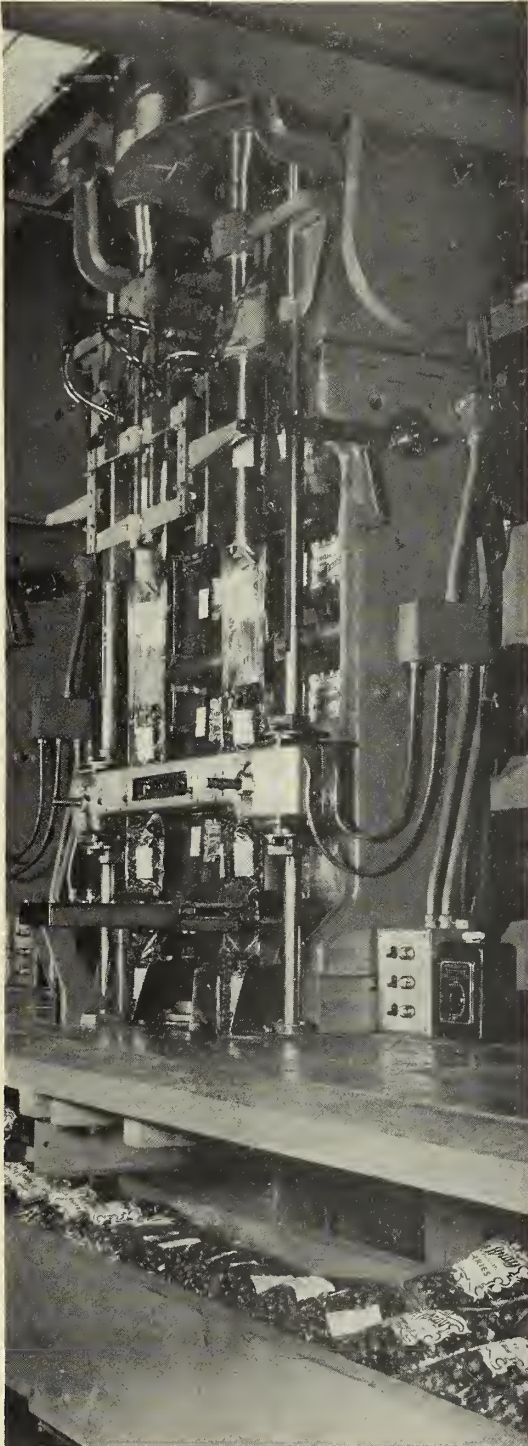
Bag Making and Filling Machines. - For speedy output, it is difficult to find a more efficient machine than the one shown on next page. It is especially well adapted for large operations.

Each machine makes, fills, and seals two lines of bags simultaneously.

Transparent film from mounted rolls in the rear of the machine is heated into twin-like tubes -- shown in the center foreground of the picture. The lower ends of the tubes are heat-sealed and a pound of fresh berries emptied into each tube. The filled tubes are then lowered about 10 inches and the tops heat-sealed by a jaw-like mechanism. A moment later, the filled bags are severed from the parent tubes and the completed packages -- the pillow shaped bags -- deposited on the conveyor belt below. Up to this point, the process has been entirely automatic, no hand labor being involved.

Measurement is on a volumetric basis which means that the machine needs to be adjusted carefully to the size and variety of the cranberries being packaged. The packages are spot-checked to assure accuracy.

As the pillow-shaped bags drop onto the conveyor belt, they move past a crew of girls who pack them into shipping cartons with lightning speed. Thereupon, the filled cartons move through an automatic sealing machine which firmly closes each carton.



These giant trans-wrap machines are extremely efficient for large operations. Each machine makes, fills, and seals 2 lines of bags simultaneously.

brand name, recipes, and other lettering may fall on any part of the pillow. This makes a less attractive array. These are matters requiring additional study.

For efficient uninterrupted packing, it is essential that the temperature and humidity of the packaging room be under careful control. To assure proper heat-sealing, it is necessary to eliminate static and to maintain uniform temperature. An expert mechanic needs to be on hand at all times to service the machine and to maintain uniform atmospheric conditions.

These machines cost from \$7,000 to \$9,500 installed. This does not include the cost of conveyors and the case sealer. Because of the higher initial cost and the more delicate operational requirements, only one cooperatively-owned cranberry plant is using this type of machine at present. However, this association likes the machine well enough to have installed four of them. The output of these four machines is carried away by a single large conveyor belt. Thus, if one machine goes out of commission for a few moments, the output of the other three is still ample to keep the packaging crew profitably occupied while the mechanic services the faulty machine.

Moreover, the packaging crew is generally large and flexible enough to permit the individual girls to take short rest periods at separate times without stopping the packaging operation.

Not all handlers are enthusiastic about the pillow-shaped bags. Buyer resistance has developed in a number of markets. Some handlers point out that the bags are too loosely packed, resulting in a flimsy, non-rigid package. Others dislike the fact that there is little uniformity in the location of the printing. The

COMPARATIVE COST OF CELLOPHANE PACKAGING BY TYPE OF MACHINE

In the light of the foregoing discussion, it is illuminating to compare the packaging costs of the two types of machines. Table 2 shows that the larger trans-wrap type of machine packed at lower costs for the quantities studied than did the other type.

The average cost of packaging a case of cranberries in cellophane was 61.7 cents for the machines using ready-made bags as compared to 46.3 cents in the large plant where trans-wrap machines were used. This is a net difference of 15.4 cents per case of 24 one-pound bags.

Cost of Cellophane Bags. - More than two thirds of this differential was in the cost of cellophane alone. Cellophane purchased in large printed rolls cost an average of 24 cents per case whereas ready-made cellophane bags cost an average of 34.9 cents per case -- a difference of 10.9 cents.

The costs of the ready-made bags ranged from 31.2 cents to 35.4 cents per case, depending on the handling and transportation charges involved.

Cost of Carrier Case. - Normally, the cost of the carrier case would have no relation to the type of packaging machine used. Yet in the case of the large trans-wrap machines, the case cost averaged 16 cents, while for the other type it averaged 17.5 cents.

Several factors contributed to make this difference. First, the 17.5 cent average included quantities of an old-style, higher-priced case which some of the packaging houses had in their inventories and needed to use. Secondly, some of the packers bought their cases in smaller quantities with correspondingly high charges for handling and transportation.

Table 2. - *Cost of prepackaging fresh cranberries, by type of machine - 1948-49¹*

Item	Using small bag filling machines	Using large trans-wrap machines	Difference
<i>Cents per case of 24 one-lb. bags</i>			
Cellophane bags-----	34.9	24.0	10.9
Cardboard case-----	17.5	16.0	1.5
Prepackaging labor-----	8.2	4.4	3.8
Equipment depreciation-----	1.1	1.9	-.8
Total-----	61.7	46.3	15.4

¹Based on cost data for 301,035 cases packaged by small bag-filling machines and 136,886 cases filled by large trans-wrap machines.

Cost of Prepackaging Labor. - The labor cost in the case of the trans-wrap machines averaged 4.4 cents per case as compared to 8.2 cents for the bag-filling machines -- a difference of 3.8 cents per case of 24 one-pound bags.

The more favorable showing of the trans-wrap machines in this instance is attributed chiefly to the fact that no hand labor is involved in filling, settling, folding, and heat-sealing the bags.

Equipment Depreciation. - Because of the larger investment required, equipment depreciation averaged about 1.9 cents per case for the trans-wrap machines as compared to 1.1 cents for machines using ready-made bags. This meant a difference of 0.8 cents per case. These figures assume an annual depreciation of 10 percent of the value -- the rate customarily used in calculating depreciation for this type of equipment.

As shown in table 2, the depreciation cost per case packed was about twice as much for the large trans-wrap machines as for the smaller machines using ready-made bags. Actually the investment for one of these large machines is likely to amount to about five or six times that of the smaller machines. However, the depreciation cost per case packed is directly proportional to the quantities packaged by each machine. This depreciation cost may be a reflection both of the volume packed and of the amount invested.

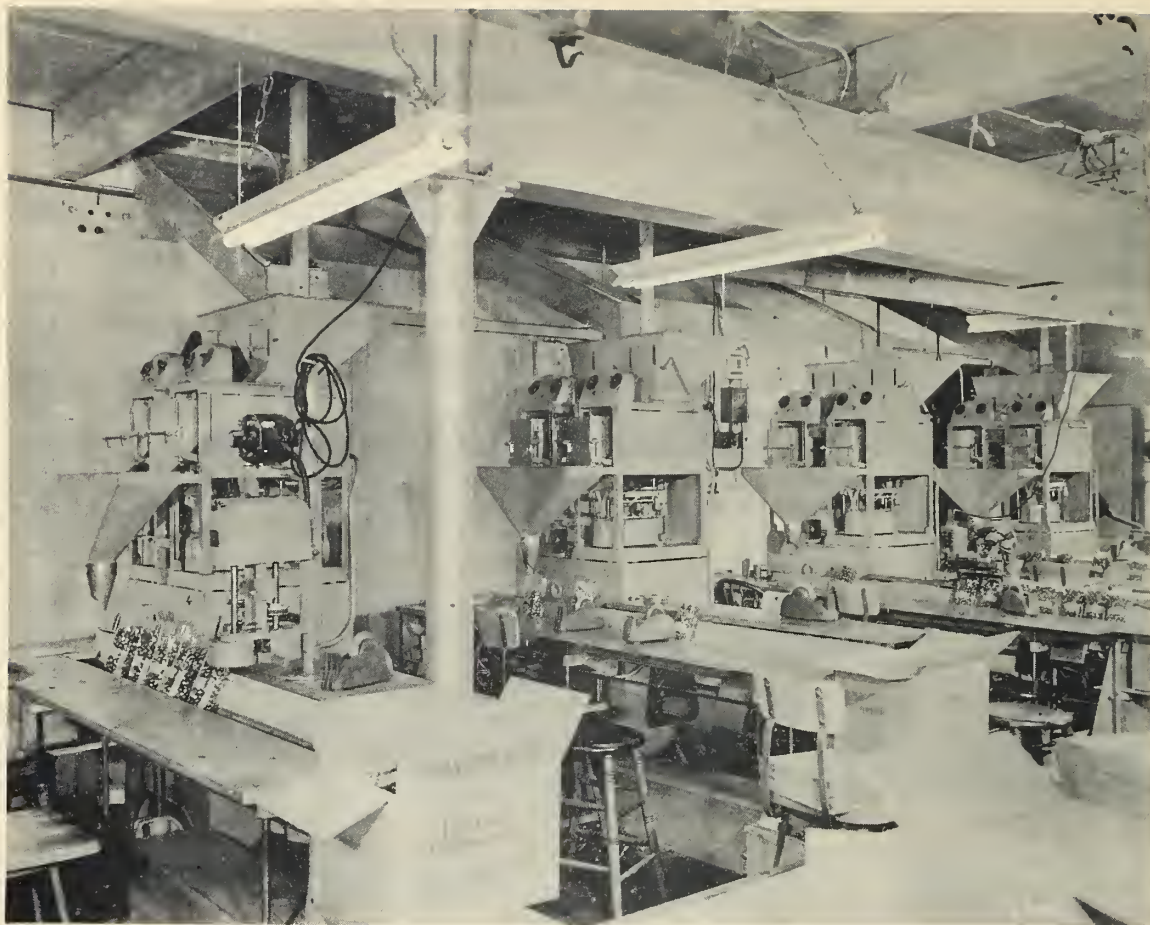
It is reasonable to expect these depreciation costs to decline as the number of cases packed increases.

CUSTOM PACKING

Most of the prepackaging of cranberries has been done by cooperatively-owned equipment in centralized packing houses. However, a substantial amount of custom packing is done in some localities.

In fact, custom packing provides an interesting sidelight on how some cranberry producing communities were able to meet the almost overnight shift in demand for cranberries in cellophane. In New Jersey, for instance, four of the largest producers belonging to the Growers Cranberry Company each purchased prepackaging equipment for their own packing houses. In addition to handling their own berries, these four growers also custom packed the cranberry crops of other members of the association.

No statistics were collected as to the quantity custom-packed in the several States. Nor does it appear particularly beneficial under rapidly changing circumstances to discuss the rates charged for these services. The significant point is that custom packing provided a satisfactory means of getting the job done quickly for growers who otherwise would have had no facilities for this service.



Centrally located establishments such as this large plant at Wareham, Mass., can prepackage a carload or truck load of berries in short order. This building — once a dehydration plant -- is devoted entirely to prepackaging cranberries that are brought in from screening houses in the surrounding territory.

OUTLOOK FOR CRANBERRIES IN TRANSPARENT BAGS

The demand for cranberries in cellophane looks encouraging.

The last 2 years have witnessed particularly large spurts in demand for cranberries in transparent bags. The combined annual sales of the cooperatives indicate that about 54 percent of the berries marketed fresh in 1948-49 were sold in cellophane. For the 1949-50 season officials of cranberry cooperatives predict that this figure will reach 75 percent or better. With the majority of packing plants now geared to do this type of packaging, it is reasonable to expect that this percentage will not only be maintained, but possibly surpassed in subsequent seasons.

Consumers, retailers, and wholesalers are expressing a decided preference for the handy, attractive cellophane package. Consumers find it saves time to buy the one-pound ready-to-take-home package. Retailers have discovered that it saves store labor and speeds up the calculations of margins and mark-ups. Wholesalers have seen that their consumer-size packages move promptly while the sale of old-style quarter-barrel boxes lags.

U. S. Dept. of Agriculture storage tests in 1948-49 indicated that it is practical to hold good quality, prepackaged cranberries in refrigerated storage from 4 to 8 weeks without excessive spoilage. Generally speaking it is desirable to retail the cranberries as promptly as feasible once they are prepackaged. Truck shipments are being used effectively to expedite transportation.

A carefully executed advertising program by the Agricultural cooperatives has helped to stimulate fresh market demand for cranberries. Expertly arranged retail displays have extended the normal marketing season and encouraged impulse purchases.

All these things indicate that despite the perplexities confronting shippers, an increasingly large percentage of the cranberries sold in fresh form will be packed in consumer-size, transparent bags.

PREPACKAGING CRANBERRIES IN WINDOW CARTONS

Although the one-pound window carton was one of the first consumer-size packages tried by cranberry packers, it has never had the popular



This attractive window carton requires no costly packaging equipment. Its around-the-corner transparent panel protects the berries and offers an excellent package for display and home storage uses.

acceptance that the cellophane bag has experienced. Among the principal factors working against its wider use has been the higher cost, the looseness of the pack, the limited visibility, and the fact that the film on the windows cracked and the glued edges sometimes gave away.

COSTS SOMEWHAT HIGHER

The price of cartons has generally exceeded that of cellophane bags. The differential in price has tended to narrow somewhat in recent years. In Wisconsin, where the window carton has had its best reception, the prevailing cost in 1948-49 was about 2.2 cents each or about 52.8 cents per case of 24 units. In comparison, printed ready-made bags were available in the same area at about 1.3 cents each or about 31.2 cents per case of 24 units. This amounts to a difference of 21.6 cents per case in 1948-49.

However, the reported cost of the same carton in 1949-50 was down to about 1.75 cents each or about 42 cents per case of 24 units. With cellophane costing 31.2 cents per case, this narrowed the difference between cartons and cellophane to about 10.8 cents per case of 24 units.

A complete comparison would include consideration of the labor costs incurred in filling these two types of containers. This is bound to vary considerably and because of the small quantity packed in window cartons to date it was not considered feasible to undertake an estimate. It is common knowledge, however, that the labor cost incurred in hand filling the cartons is somewhat higher than that involved in machine filling the ready-made transparent bags.

To fully absorb the additional container and labor expense involved, it is probable that shippers would need to receive about 15 cents more per case of 24 cartons than for a case of 24 cellophane bags. The American Cranberry Exchange, for example, included a differential of this amount in the schedule of prices it announced September 10, 1949 -- at the opening of the 1949-50 season. These quotations were: \$3.00 per quarter-barrel box; \$3.25 for 24 one-pound cellophane bags; and \$3.40 for 24 one-pound window cartons.

However, subsequent selling experience indicated a general hesitancy on the part of buyers to pay any more for berries packaged in cartons than for berries packed in bags, when both are obtainable. Consequently the tendency has been to lessen the differential and in some cases to offer both at the same price.

TIGHT PACKAGE PREFERRED

Considerable moisture is likely to escape from the cranberries between the time they are packaged and the time they are retailed. A general complaint from retailers has been that the hand packed cartons sometimes rattle by the time they reach the retail stores. This gives some consumers the impression that the measure is short or skimpy.

To forestall extensive rattling, carton manufacturers have put out a snugger package that requires packing to the hilt to obtain the designated

weight. This has the effect of procuring a tighter pack and reducing rattling.

VISIBILITY IMPROVED

A common complaint against the one-pound carton for cranberries in the past was that it gave low visibility to a naturally attractive product. Package designers have worked on this problem and have developed a carton that gives much better visibility. They have enlarged the window and extended it over both the top and the front of the carton. This greater visibility, coupled with brightly colored illustrations and appetizing recipes, has resulted in a vastly improved consumer package.

WINDOW FAILURE DIMINISHED

One of the principal drawbacks to the window carton in the past has been the loss and inconvenience resulting from window failure. Handlers complained that the film cracked and that the glued edges sometimes gave way. In either case the package generally became unsalable and an unprofitable item to the handler.

Strengthening of the transparent film through the use of a 120 gauge cellulose acetate window and the application of greater know-how in the development of suitable adhesives have resulted in a much more satisfactory carton. However, for best results it is imperative that rough handling and sudden temperature changes be held to a minimum.

OUTLOOK FOR CRANBERRIES IN WINDOW CARTONS

A number of packers firmly believe that the one-pound window carton has far greater potentialities than its current limited use indicates.

Now that a more satisfactory carton is available at a somewhat lower price, it is probable that its use will increase. The carton is particularly fitted to small growers because it can be filled by hand. Retailers and housewives also like it.

The grocer likes the window carton because it is easy to display. It lends itself to self service. Margins are easily calculated. The brand name leads satisfied customers to come back for more.

The housewife likes the window carton because she can see what's inside. She finds the carton easy to store and to refrigerate.

Many of these advantages apply equally to transparent bags.

Perhaps the greatest merit of the window carton is that it provides a convenient container for shippers who lack prepackaging equipment. As one cooperative manager expressed it: "If you do not pack in a consumer-size package you diminish your chance of making a sale or lose it entirely to a competitor who does offer a one-pound package."

The window carton meets this need for the small shipper without requiring an investment in packaging machinery.

